

**GOVERNMENT OF INDIA
SPACE
LOK SABHA**

UNSTARRED QUESTION NO:2560

ANSWERED ON:14.03.2001

LAUNCHING OF SATELLITES

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Will the Minister of SPACE be pleased to state:

- (a) total number of satellites launched into space so far ;
- (b) the total expenditure involved in each satellite;
- (c) the rate of success and failure in sending those in space;
- (d) the benefits accrued in different fields there from field-wise; and
- (e) plans of the Government in regard to launching satellites in near future?

Answer

MINISTER OF STATE IN THE DEPARTMENT OF SPACE (SMT.VASUNDHARA RAJE):

(a),(b) & (c): India has so far launched 30 satellites. Details of satellites, cost and details on success of individual satellites are given in the annexure.

(d) The Indian National Satellites (INSATs) have become an important element of the national infrastructure providing services in telecommunications, television and radio broadcasting including educational television, meteorology and disaster management . It has helped to connect inaccessible and remote areas. Also part of the satellite capacities have been leased to international space agencies under commercial agreements.

The Indian Remote Sensing Satellites have become the mainstay of the National Natural Resources Management System(NNRMS) for monitoring and managing the natural resources in the country covering important areas like agriculture, forestry, surface and ground water, minerals, urban planning, land use, land cover survey, marine resources etc. The data from the satellites are also received by several other countries under commercial agreements.

(e) There are plans to continue and enhance the space services provided by the INSAT and IRS satellites. In the INSAT- 3 series, four more satellites, namely, INSAT- 3A, INSAT-3C, INSAT-3D and INSAT-3E will be launched in the coming three years.

A next exclusive Meteorology Satellite (METSAT) is also planned for Launch in 2001- 02. Besides, experimental communication satellites, G-SAT, will be launched on board the developmental test flights of India's Geo-synchronous Satellite Launch Vehicle (GSLV).

In the IRS series, RESOURCESAT (IRS-P6), CARTOSAT-1 (IRS-P5) and CARTOSAT- 2 have been planned for launch in the coming 3 years. Besides, a Technology Experiment Satellite (TES) is also planned for launch to test advance remote sensing and other spacecraft technologies.

Annexure

Details of Indian satellites launched into space till date and the total cost involved including launching, satellite-wise

Sl.No.	Satellite	Cost (Rs. in cr)	Launch date	Achievements
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|----|-----------|------|------------|---|
| 1. | Aryabhata | 5.09 | 19.04.1975 | Successful. First Indian Satellite. Provided technological experience in building & operating a satellite system. Launched by |
|----|-----------|------|------------|---|

Russian launch vehicle Intercosmos. Free launch.

2. Bhaskara-I &A 07.06.1979 Successful. First experimental remote sensing satellite. Carried TV and microwave cameras. Launched by Russian launch vehicle Intercosmos. Free launch.
3. Bhaskara-II &A 20.11.1981 Successful. Second experimental remote sensing satellite similar to Bhaskara-I. Provided experience in building and operating a remote sensing satellite system on an end-to-end basis. Launched by Russian launch vehicle Intercosmos. Free launch.
4. Ariane 17.97 19.06.1981 Successful. First experimental communication Passenger satellite. Provided experience in building Payload and operating a three-axis stabilised Experiment communication satellite. Launched by the (APPLE) European Ariane Launch Vehicle. Free launch.
5. Rohini &&B 10.08.1979 Unsuccessful. Intended for measuring in-flight Technology performance of first experimental flight of Payload (RTP) SLV-3, the first Indian launch vehicle. Could not be placed in orbit due to launch vehicle failure. Indigenous developmental launch.
6. Rohini (RS-I) &&B 18.07.1980 Successful. Used for measuring in-flight performance of second experimental launch of SLV-3. Indigenous developmental launch.
7. Rohini (RS-D1) &&B 31.05.1981 Successful. Used for conducting some remote sensing technology studies using a landmark sensor payload. Launched by the first developmental launch of SLV-3. Indigenous developmental launch.
8. Rohini (RS-D2) &&B 17.04.1983 Successful. Identical to RS-D1. Launched by the second developmental launch of SLV-3. Indigenous developmental launch.
9. Stretched &&&C 24.03.1987 Unsuccessful. Carried payload for launch Rohini vehicle performance monitoring and for Satellite Gamma Ray Astronomy. Could not be placed in Series orbit due to failure of first developmental (SROSS-1) flight of Augmented Satellite Launch Vehicle (ASLV). Indigenous developmental launch.
- 10 Stretched &&&C 13.07.1988 Unsuccessful. Carried a remote sensing payload Rohini of German Space Agency in addition to Gamma Satellite Ray Astronomy payload. Could not be placed Series in orbit due to failure of the second (SROSS-2) developmental flight of ASLV. Indigenous developmental launch.
- 11 Stretched &&&C 20.05.1992 Successful. Launched by third developmental Rohini flight of ASLV. Carried Gamma Ray Astronomy Satellite payload. Indigenous developmental launch. Series (SROSS-C)
- 12 Stretched &&&C 04.05.1994 Successful. Launched by fourth developmental Rohini flight of ASLV. Identical to SROSS-C. Still

Satellite in service. Indigenous developmental launch.
Series, SROSS- C2)

13 Indian ++D 10.04.1982 First operational multi-purpose communication
National and meteorology satellite procured from USA.
Satellite Worked only for six months. Launched by
(INSAT-1A) US Delta launch vehicle.

14 Indian ++D 30.08.1983 Successful. Identical to INSAT-1A. Served
National for more than the design life of seven years.
Satellite Launched by US Space Shuttle.
(INSAT-1B)

15 Indian ++D 21.07.1988 Same as INSAT-1A. Served for only one
National and a half years. Launched by European
Satellite Ariane Launch Vehicle.
(INSAT-1C)

16 Indian ++D 12.06.1990 Successful. Identical to INSAT-1A.
National Launched by US Delta launch vehicle.
Satellite Still in service.
(INSAT-1D)

17 Indian \$E 10.07.1992 Successful. First satellite in the second-
National generation Indian-built INSAT-2 series.
Satellite Has enhanced service capability compared
(INSAT-2A) to INSAT-1 series. Launched by European
Ariane Launch Vehicle. Still in service.

18 Indian \$ E 23.07.1993 Successful. Second Satellite in INSAT-2 series.
National Identical to INSAT-2A. Launched by European
Satellite Ariane launch vehicle. Still in service.
(INSAT-2B)

19 Indian \$\$ F 07.12.1995 Successful. Has additional capabilities
National such as mobile satellite service,
Satellite business communication and television
(INSAT-2C) outreach beyond Indian boundaries. Launched
by European launch vehicle. Still in service.

20 Indian \$\$ F 04.06.1997 Identical to INSAT-2C. Launched by European
National launch vehicle. Became inoperable on October
Satellite US\$ 40 4, 1997 following a power bus anomaly.
(INSAT-2D)/ Million Nov 1997 Consequent on the loss of INSAT-2D, an in
(INSAT-2DT) orbit Satellite (ARABSAT-1C) was acquired
from ARABSAT to partially augment INSAT
capacity and renamed as INSAT-2DT.

21 Indian \$\$ F 03.04.1999 Successful. Provides Telecommunication,
National Television Broadcasting and Meteorological
Satellite Services. Eleven transponders of the satellite
(INSAT-2E) leased to INTELSAT on commercial basis.
Still in service.

22 Indian # G 22.03.2000 Successful. Provides telecommunication
National and broadcasting service. Still in service.
Satellite
(INSAT-3B)

23 Indian Remote H 17.3.1988 Successful. First operational remote sensing
Sensing satellite. Launched by a Russian Launch
Satellite Vehicle, Vostok.
(IRS-1A)

- 24 Indian Remote H 29.08.1991 Successful. Same as IRS-1A. Launched by
Sensing a Russian Launch Vehicle, Vostok.
Satellite(IRS-1B) Still in service.
- 25 Indian Remote H 20.09.1993 Unsuccessful. Carried remote sensing payloads.
Sensing Could not be placed in orbit due to failure
Satellite (IRS-1E) of first developmental launch of PSLV.
- 26 Indian Remote 17.90 15.10.1994 Successful. Carried remote sensing payload.
Sensing Launched by second developmental flight of PSLV.
Satellite (IRS- P2)
- 27 Indian remote I 28.12.1995 Successful. Carries advanced remote
Sensing sensing cameras. Launched by Russian Molniya
Satellite (IRS-1C) launch vehicle. Still in service.
- 28 Indian Remote I 29.09.1997 Successful. Identical to IRS-1C. Launched
Sensing by India's PSLV. Still in service.
Satellite (IRS-1D)
- 29 Indian Remote 28.75 21.03.1996 Successful. Carries remote sensing payload
Sensing and an X-ray astronomy payload. Launched by
Satellite (IRS-P3) third developmental flight of PSLV.
Still in service.
- 30 Indian Remote 47.75 26.5.1999 Successful. Carries remote sensing payload for
Sensing Ocean resource survey and for scientific
Satellite (IRS- research in oceanographic.
P4) (OCEANSAT)

&A) = Cost of Bhaskara-I & II is Rs 7.95 Crore
 &&B) = Total cost of Rohini series is Rs 2.62 Crore
 &&&C) = Total cost of SROSS series is Rs 13.26 Crore
 ++D) = Total cost of INSAT-1 series including launch is Rs 468.57 Crore
 \$ E) = Total cost of INSAT2A & 2B including launch is Rs 527.94 Crore
 \$\$\$F) = Total cost of INSAT-2C, 2D & 2E including launch is Rs 1265.80 Crore
 # G) = Included in Rs.2429.12 Cr. sanctioned for INSAT-3 series (INSAT-3A,3B,3C,3D & 3E)
 H) = Total cost of IRS-1A, 1B & 1E is Rs 105.29 Crore
 I) = Total cost of IRS-1C including launch and IRS-1D is Rs 246.50 Crore